

Chemical Engineering Thermodynamics MCQ Question Answer

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Question: 1. $PV^\gamma = \text{Constant}$ (where, $\gamma = C_p/C_v$) is valid for a/an _____ process.

- Option A. Isothermal
- Option B. Isentropic
- Option C. Isobaric
- Option D. Adiabatic

Question: 2. Partial molar free energy of an element A in solution is same as its

- Option A. Chemical potential
- Option B. Activity
- Option C. Fugacity
- Option D. Activity co-efficient

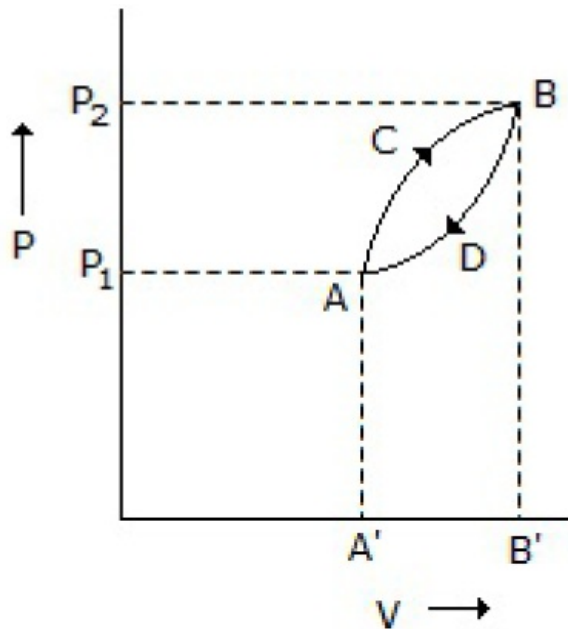
Question: 3. Kopp's rule is used to calculate the heat capacity of

- Option A. Solids
- Option B. Liquids
- Option C. Gases
- Option D. All (A), (B) & (C)

Question: 4. Heat is added at constant temperature in an ideal _____ cycle.

- Option A. Stirling
- Option B. Brayton
- Option C. Rankine
- Option D. None of these

Question: 5. A thermodynamic system is taken from state A to B along ACB and is brought back to A along BDA as shown below in the P-V diagram. The net work done during the complete cycle is given by the area covered by



Option A. $P_1ACBP_2P_1$

Option B. $ACBB^1A^1A$

Option C. ACBDA

Option D. $ADBB^1A^1A$

Question: 6. Linde gas liquefaction process employs cooling

Option A. By throttling

Option B. By expansion in an engine

Option C. At constant pressure

Option D. None of these

Question: 7. For the gaseous phase chemical reaction, $C_2H_4(g) + H_2O(g) \leftrightarrow C_2H_5OH(g)$, the equilibrium conversion does not depend on the

Option A. Steam to ethylene ratio

Option B. Temperature

Option C. Pressure

Option D. None of these

Question: 8. Pick out the wrong statement.

Option A. Trouton's ratio of non-polar liquids is calculated using Kistyakowsky equation

Option B. Thermal efficiency of a Carnot engine is always less than 1

Option C. An equation relating pressure, volume and temperature of a gas is called ideal gas equation

Option D. None of these

Question: 9. Which of the following will increase the volume of a real gas by four times?

Option A. Doubling the absolute temperature as well as pressure of the gas

Option B. Reducing pressure to one fourth at constant temperature

Option C. Reducing temperature to one fourth at constant pressure

Option D. Reducing the temperature to half and doubling the pressure

Question: 10. Compressibility factor (i.e., the ratio of actual volume of gas to the volume predicted by ideal gas law) for all gases are

- Option A. Always greater than one
- Option B. Same at the same reduced temperature
- Option C. Same at the same reduced pressure
- Option D. Both (B) & (C)

Question: 11. Claude's liquefaction process employs the cooling of gases by

- Option A. Expansion in an engine
- Option B. Following a constant pressure cycle
- Option C. Throttling
- Option D. None of these

Question: 12. The most important application of distribution law is in

- Option A. Evaporation
- Option B. Liquid extraction
- Option C. Drying
- Option D. Distillation

Question: 13. When a gas in a vessel expands, its internal energy decreases. The process involved is

- Option A. Reversible
- Option B. Irreversible
- Option C. Isothermal
- Option D. Adiabatic

Question: 14. The expression for entropy change given by, $\Delta S = - nR \ln (P_2/P_1)$, holds good for

- Option A. Expansion of a real gas
- Option B. Reversible isothermal volume change
- Option C. Heating of an ideal gas
- Option D. Cooling of a real gas

Question: 15. Fugacity co-efficient of a substance is the ratio of its fugacity to

- Option A. Mole fraction
- Option B. Activity
- Option C. Pressure
- Option D. Activity co-efficient

Question: 16. C_v for an ideal gas

- Option A. Does not depend upon temperature
- Option B. Is independent of pressure only

- Option C. Is independent of volume only
- Option D. Is independent of both pressure and volume

Question: 17. A system in which there is exchange of energy but not of mass, is called a/an _____ system.

- Option A. Isolated
- Option B. Open
- Option C. Insulated
- Option D. Closed

Question: 18. Specific _____ does not change during phase change at constant temperature and pressure.

- Option A. Entropy
- Option B. Gibbs energy
- Option C. Internal energy
- Option D. Enthalpy

Question: 19. Fugacity is a measure of the

- Option A. Escaping tendencies of the same substance in different phases of a system
- Option B. Relative volatility of a mixture of two miscible liquids
- Option C. Behaviour of ideal gases
- Option D. None of these

Question: 20. Translational kinetic energy of molecules of an ideal gas is proportional to (where, T = absolute temperature of the gas)

- Option A. T
- Option B. $\sqrt{T}$
- Option C. T^2
- Option D. $1/\sqrt{T}$

Question: 21. In a turbine, the fluid expands almost

- Option A. Isothermally
- Option B. Isobarically
- Option C. Adiabatically
- Option D. None of these

Question: 22. The number of degrees of freedom for an azeotropic mixture in a two component vapour-liquid equilibria is/are

- Option A. Zero
- Option B. One
- Option C. Two
- Option D. Three

Question: 23. In a P-V diagram (for an ideal gas), an isothermal curve will coincide with an adiabatic curve (through a point), when

- Option A. $C_p < C_v$
- Option B. $C_p = C_v$
- Option C. $C_p > C_v$
- Option D. $C \geq C_v$

Question: 24. Specific/molar Gibbs free energy for a pure substance does not change during

- Option A. Sublimation
- Option B. Vaporisation
- Option C. Melting
- Option D. Either (A), (B) or (C)

Question: 25. In the decomposition of PCl_5 represented by, $\text{PCl}_5 \rightleftharpoons \text{PCl}_3 + \text{Cl}_2$, decrease in the pressure of the system will _____ the degree of dissociation of PCl_5 .

- Option A. Increase
- Option B. Decrease
- Option C. Not alter
- Option D. None of these

Question: 26. The internal energy of an incompressible fluid depends upon its

- Option A. Pressure
- Option B. Temperature
- Option C. Both (A) & (B)
- Option D. Neither (A) nor (B)

Question: 27. $(\partial H / \partial T)_p$ is the mathematical expression for

- Option A. C_v
- Option B. Entropy change
- Option C. Gibbs free energy
- Option D. None of these

Question: 28. Enthalpy changes over a constant pressure path are always zero for _____ gas.

- Option A. Any
- Option B. A perfect
- Option C. An easily liquefiable
- Option D. A real

Question: 29. The acentric factor of a material, ' ω ', is defined as $\omega = -\log_{10}(P_r^{\text{sat}})T_r^{-1} = 0.7$, where, P_r^{sat} = reduced vapor pressure, T_r = reduced temperature. The value of acentric factor is always

Option A. > 2

Option B. < 1

Option C. > 1

Option D. < 3

Question: 30. Claude gas liquefaction process employs cooling

Option A. At constant pressure

Option B. By throttling

Option C. By expansion in an engine

Option D. None of these

Answer Sheet

1	D	
2	A	
3	A	
4	A	
5	C	
6	A	
7	D	
8	C	
9	B	
10	D	
11	A	
12	B	
13	A	
14	B	
15	C	
16	D	
17	D	
18	B	
19	A	
20	A	
21	C	
22	B	
23	B	
24	D	
25	A	
26	B	
27	D	
28	B	
29	B	
30	C	